

Amendment and Response

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the molecular deposition domain interacts with a molecular deposition probe having at least one microsphere attached thereto.

92. (New) The array of claim 91 wherein the substrate includes a surface chosen from one or more of the group consisting of glass, silicone, tetrafluoroethylene, polystyrene, polycarbonate, and polypropylene.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Marked-up Version Showing Changes.**"

REMARKS

Claims 56-63 and 65-92 are pending.

Claim 56 has been amended to more clearly define the invention. Support for the amendments can be found throughout the specification and claim 66 as originally filed. New claims 76-92 were added.

No new subject matter has been added.

Reconsideration of the pending claims is therefore respectfully requested in view of the amendments and the following comments.

I. Rejection of Claims 56-63 and 65-75 under 35 U.S.C. § 112, First Paragraph

Claims 56-63 and 65-75 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the invention. Applicants respectfully traverse this rejection.

The pending Office Action asserts that the incorporation of the phrase "at least two" was not found to have basis in the specification. Although Applicants respectfully maintain their previous arguments that such support can be found in the specification, the claims have been amended to remove this language, thereby obviating the basis for this rejection.

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Additionally, the term "surface" has been replaced with the term "substrate." Applicants consider this amendment for clarity purposes only. This amendment is also useful in the arguments which follow. Support for this amendment can be found throughout the specification, as well as in originally filed claim 66.

Reconsideration and withdrawal of this rejection is respectfully requested.

II. Rejection of Claims 56-63, 65, 67, 68 and 75 under 35 U.S.C. § 102(a)

Claims 56-63, 65, 67, 68 and 75 are rejected under 35 U.S.C. § 102(a) as being anticipated by Dontha et al. J. Pharm. Biomed. Analysis (February 1999) 19:83-91 (hereinafter "Dontha"). Applicants respectfully traverse this rejection. The Office Action relied on Dontha to show that there are "two molecules per deposition domain." This limitation has been removed from the claims, thereby obviating this basis for rejection.

Furthermore, in order for Dontha to anticipate claim 1, each claimed element must be disclosed in the same. The claims to the present invention, however, clearly point out novel features not taught in Dontha.

Dontha immobilizes photobiotin onto an electrode surface and creates an array of lines by using an HeCd laser at 325 nm to generate an interference pattern. These photopatterned lines created by the laser are the domains. The line (domain) width reported is approximately .85 microns. Nothing in Dontha teaches that the interference pattern created by the 325 nm laser is less than 1.18 microns, the maximum required for a .85 micron wide line to be less than one micron in total area. Moreover, the line length as shown in Figure 3, is at least 50 microns, and possibly longer. Consequently, the total area of the pattern is at least 40 microns.

Additionally, Figure 2 of Dontha does not show sub-micron domains but simply shows the fluorescence intensity of a length of the line/domain. The minimum length of such a line is shown in the lower left hand corner of Figure 2. The image in Figure 2 is shown at a distance of 2.5 microns, representing a line length significantly more than the maximum 1.18 required for a .85 micron wide line to exceed a one micron in area domain.

In contrast, the present invention claims a molecular deposition domain "wherein the spatial address of the domain is less than one micron in area" (emphasis added) Claiming a molecular array with a domain that has a spatial address of less than one micron in area provides

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clear structural differences over Dontha. Since Dontha does not teach or suggest all the elements of the claimed invention, Dontha does not anticipate the present invention.

Finally, new claims 76-92 claim subject matter not disclosed or suggested by Dontha. Independent claims 76, 83, 86, 89, and 91 each claim an array with a deposition domain deposited at a "known location" and require that each deposition domain be less than one micron in total area. Dontha does not disclose or suggest such an array. Dependent claims 77-82, 84-85, and 87-88, 90, and 92 each depend from one of these independent claims. New claims 76-92 are therefore patentably distinct from Dontha.

III. Rejection of Claims 56-63 and 65-75 under 35 U.S.C. § 103(a)

Claims 56-63 and 65-75 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dontha in view of Eggers and further in view of Brenner. Applicants respectfully traverse this rejection.

The arguments presented above with regard to Dontha are reiterated here and are incorporated in their entirety.

Eggers does not remedy the deficiencies of Dontha. Eggers discloses "an array 12 of test sites 14" that include "detection circuitry 16 and recognition circuitry 18" Col. 3, lns. 63-63. The test sites further include a well 20 and probes 26 *formed within* the well 20. See Figures 1-3. More importantly, Eggers utilizes photolithography to form wells 20 *in* the substrate 22. See Figures 2-3, 6 and 7.

In stark contrast to the teachings of Eggers, the present invention does not require that wells be mechanically ablated *into the substrate* to provide a deposition site. The present claims claim a domain that is deposited *on* the substrate. Therefore, the present invention provides the advantage that an unablated substrate not having wells (depressions in the substrate) may be used for characterizing molecular interaction events.

Brenner, a tertiary reference, also fails to remedy the deficiencies of both Dontha and Eggers. Brenner discloses "a method of labeling and sorting molecules, particularly polynucleotides." Col. 6, lns 12-13. Brenner, however, teaches "discrete regions" in which "the regions range in area from several μm^2 , e.g. 3-5, to several hundred μm^2 , e.g. 100-500." Col. 12, lns 51-57. The Examiner relies on Brenner to teach "the placement of alkanethiolates onto solid

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supports." Office Action, pg. 5. Brenner, however, does not remedy the deficiencies of Dontha or Eggers for making a domain that is less than one micron in area.

Both Eggers and Brenner fail to teach or suggest, provide any motivation or an expectation of success such that one skilled in the art would utilize a molecular array for characterizing molecular interaction events having at least one molecular deposition domain located on a substrate wherein the spatial address of the domain is less than one micron in area. Furthermore, both Eggers and Brenner fail to teach or suggest, or provide any motivation or an expectation of success such that one skilled in the art would appreciate that the domain having a spatial address of less than one micron in area would include a biologically or chemically based molecule directly deposited onto the substrate.

None of the references, alone or in combination, teach or suggest or provide any motivation or an expectation of success that one skilled in the art would utilize a molecular array for characterizing molecular interaction events having at least one molecular deposition domain located on a substrate wherein the spatial address of the domain is less than one micron in area. Furthermore, none of the references, alone or in combination, teach or suggest, provide any motivation or an expectation of success such that one skilled in the art would appreciate that the domain having a spatial address of less than one micron in area would include a biologically or chemically based molecule directly deposited onto the substrate.

Finally, new claims 76-92 claim subject matter not disclosed or suggested, alone or in combination, by Dontha, Eggers, or Brenner. Independent claims 76, 83, 86, 89, and 91 each claim an array with a deposition domain deposited at a "known location" and require that each deposition domain be less than one micron in total area. Furthermore, the claims 76, 83, 86, 89, and 91 each claim a deposition domain that is deposited on the surface of a substrate. Eggers discloses and claims a domain wherein the substrate is ablated and the domains are formed within the resultant wells. Brenner does not teach a domain of less than one micron in total area; nor does Dontha. Neither Dontha, Eggers, nor Brenner therefore teach, disclose, or suggest the subject matter claimed in claims 76, 84, 86, 89, or 91. Dependent claims 77-82, 84-85, 87-88, 90, and 92 each depend from one of these independent claims. New claims 76-92 are therefore patentably distinct from Dontha.

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III. Dependent Claims 57-63 and 65-75 Are Allowable

Because dependent claims 57-63 and 65-75 depend on independent claim 56 either directly or indirectly, the arguments presented above apply *a fortiori* to these claims. As such, each of the dependent claims are patentable over the references of record.

CONCLUSION

In view of the above amendments and preceding remarks, Applicants respectfully urge that the Examiner's rejections be reconsidered and withdrawn, and that the pending claims be allowed. However, if the Examiner believes that any issues remain unresolved, he is invited to telephone the undersigned to expedite allowance. The Commissioner is hereby authorized to charge the amount of \$325.00 to **Deposit Account No. 04-1420**, to cover the fees for the added claims.

Respectfully submitted,

Date: 2/5/02

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MARKED-UP VERSION SHOWING CHANGES**IN THE CLAIMS**

56. (Twice Amended) A molecular array for characterizing molecular interaction events, comprising:

- (a) a [surface] substrate; and
- (b) at least one molecular deposition domain on said [surface] substrate wherein the spatial address of the domain is less than one micron in area and each domain includes [at least two] a biologically or chemically based [molecules] molecule directly deposited on the substrate.

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